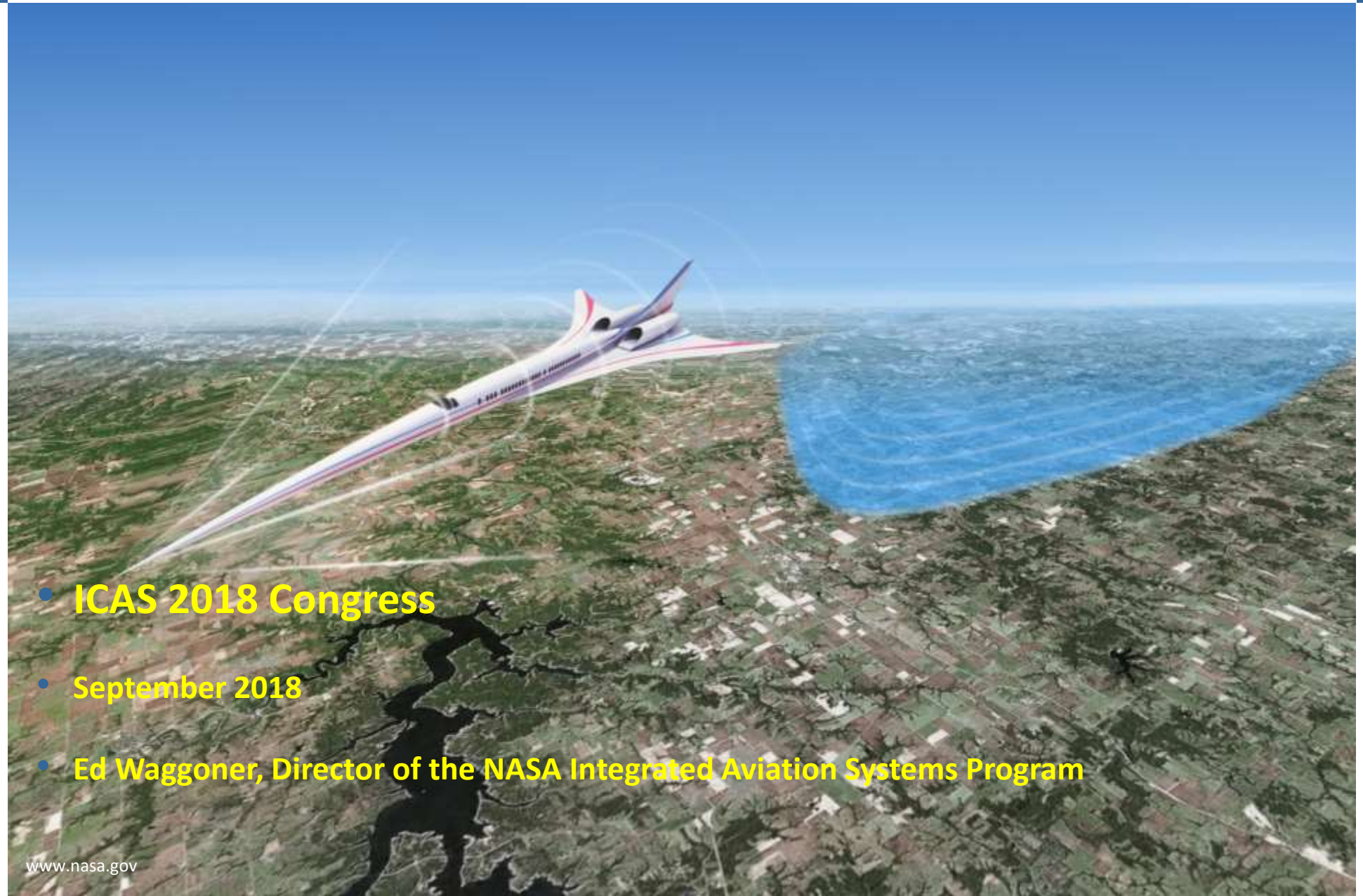
Supersonic Research at NASA

Ed Waggoner
Director of the Integrated
Aviation Systems Program, NASA
USA

Supersonic Research at NASA



- **ICAS 2018 Congress**
- **September 2018**
- **Ed Waggoner, Director of the NASA Integrated Aviation Systems Program**

www.nasa.gov

Innovation in Commercial Supersonic Flight

WHY?

Commercial supersonic flight represents a potentially large new market for aircraft manufacturers and operators world-wide

The government plays a central role in developing the data needed for the regulation change that is essential to enabling this new market

- Global demand for air travel is growing, which places a demand on speed
- Supersonic air travel offers many benefits including personal productivity and welling for travelers; rapid for transport time-critical cargo
- New supersonic products will create substantial value for aerospace manufacturers, employees and users
  - Large potential market predicted: - business aircraft followed by larger commercial aircraft
  - Technology leadership established through initial products will lead to development of larger, more capable airliners

The Vision for Commercial Supersonic Flight

The emerging potential market has generated renewed interest in civil supersonic aircraft

- Evidenced by the appearance of several commercial programs even with existing restrictions on overland flight and other challenges

Overland Flight Restrictions based on unacceptable sonic boom noise are viewed as the main barrier to this vision

The vision of the Supersonics Community is a future where fast air travel is available for a broad spectrum of the traveling public.

- Future supersonic aircraft will not only be able to fly overland without creating an “unacceptable situation” but compared to Concorde and SST will be efficient, affordable and environmentally responsible

Overcoming the Barrier to Overland Flight

NASA's Low Boom Flight Demonstration is specifically planned to generate key data to validate design approaches and support development of en route certification standards based on acceptable sound levels

- **New Environmental Standards are needed to open the market to supersonic flight**
- **An En route Noise Standard is the biggest challenge**
  - Requires proof of new design approaches
  - Must replace current prohibitions
  - No relevant data on exists to define limits
    - Community data from large, diverse population is a requirement
  - Standard must be accepted internationally

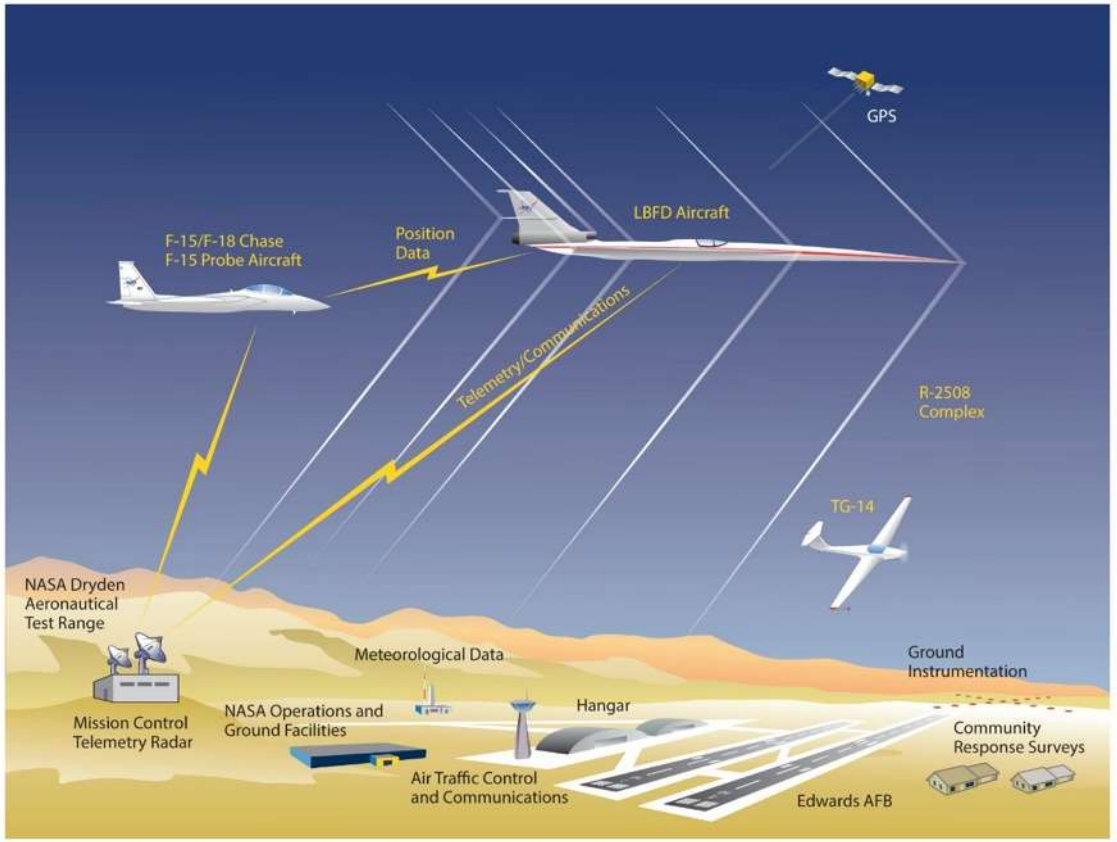
www.nasa.gov

Low-Boom Flight Demonstration Phases

Phase 1 - Aircraft Development
- Detailed Design
- Fabrication, Integration, Ground Test
- Checkout Flights
- Envelope Expansion

Phase 2 – Acoustic Validation
- Measuring and characterizing the sonic ~~boom~~ thump

Phase 3 – Community Response
- Initial community response overflight study
- Multiple campaigns over representative communities and weather across the U.S.



Overcoming the Barrier to Supersonic Overland Flight

NASA's LOW-BOOM FLIGHT DEMONSTRATOR

Key Requirements

- The acoustic signal of the X-plane must effectively replicate that of future larger supersonic commercial aircraft.
- The X-plane must conduct community overflight tests in a manner representative of typical flight operations of future aircraft.

Derived Requirements

- New airframe design to achieve desired acoustic signal, with smallest size that meets key acoustic requirements
- Use of components from existing aircraft to reduce cost (F-18 engine, T-38 canopy and cockpit, F-16 landing gear, etc.)
- Payload capacity: single pilot/flight test instrumentation

Thank you for your attention!